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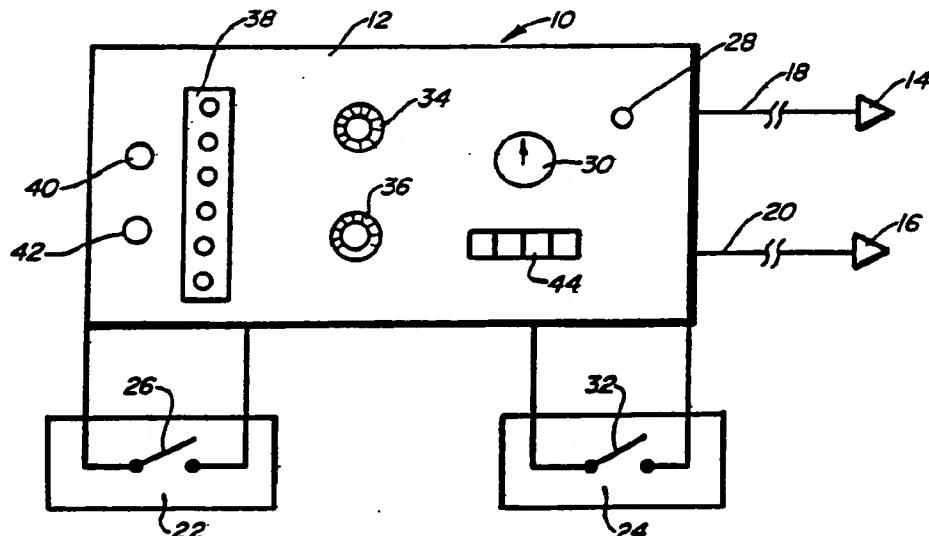
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## Published

With international search report.

With amended claims.

## (54) Title: METHOD AND APPARATUS FOR PHOTOEPIGILATION AND ELECTROEPIGILATION



## (57) Abstract

An epilation unit (10) having separate probes for utilizing in photoepilation (14) or electroepilation (16) independently of one another for removing body hair. The electroepilation power applied easily can be visually determined by observing an indicating lamp array (38), such as a plurality of LED's. The operator can apply one or the other of the probes (14, 16) or alternatively can apply both probes to remove the hair where desired.

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Description

METHOD AND APPARATUS FOR  
PHOTOEPILATION AND ELECTROEPILATION

Technical Field

5        This invention relates to epilation primarily for cosmetic and medical purposes and more particularly to an improved method and apparatus for performing both photoepilation and electroepilation in a single unit.

Background Art

10      Removal of hair utilizing light energy is a known, commercially available process. Electroepilation is the removal of hair utilizing electrical energy and also is a known, commercially available process. Both processes are performed to obtain cosmetically more 15      pleasing skin by removal of unsightly hair from locations such as the face, legs, arms and back.

Electroepilation was first developed and has been widely utilized, but can result in some trauma to the skin in the area where the hair is removed.

20      Photoepilation also is widely utilized and does not appear to produce any significant trauma since the light energy is absorbed in the blood vessels to cause coagulation. However, it also has been discovered that not all hair easily can be removed by photoepilation or 25      with electroepilation and sometimes the hair can only be removed by utilizing a combination of electroepilation and photoepilation.

30      Therefor it would be desirable to provide a unit for performing both electroepilation and photoepilation, which electroepilation is easily controlled to prevent unnecessary trauma.

Disclosure of Invention

35      The above and other disadvantages of prior art epilation techniques and apparatus are overcome in accordance with the present invention by providing both photoepilation and electroepilation in a single unit. The electroepilation applied electrical energy easily can be controlled by the operator by providing an array of indicating lamps, such as LED's, to provide an easi-

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ly identifiable measure of the power applied. The unit has separate photoepilation and electroepilation applying probes operated independently of one another.

Accordingly, a first object of the invention is to provide a method of epilation of hair bodies from a patient, characterized by providing a unit having a photoepilation probe and an electroepilation probe, operating the probes independently of one another to remove the hair bodies, providing pulses of light energy from the photoepilation probe at least to a first set of the hair bodies, providing pulses of electrical energy from the electroepilation probe at least to a second set of the hair bodies and providing both pulses of light energy from the photoepilation probe and pulses of electrical energy from the electroepilation probe to at least a third set of the hair bodies.

A second object of the invention is to provide an apparatus for epilation of hair bodies from a patient, characterized by a single unit having photoepilation probe means and electroepilation probe means and means for operating the probes independently of one another to remove the hair bodies, providing pulses of light energy from the photoepilation probe at least to a first set of the hair bodies, providing pulses of electrical energy from the electroepilation probe at least to a second set of the hair bodies and providing both pulses of light energy from the photoepilation probe and pulses of electrical energy from the electroepilation probe to at least a third set of the hair bodies.

30 Brief Description of Drawings

The preferred embodiments of this invention will now be described by way of example, with reference to the drawings accompanying this specification in which:

35 Figure 1 is a partial schematic and partial diagrammatic illustration of one embodiment of the present invention; and

Figure 2 is a block diagram of one embodiment of the invention.

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Best Mode for Carrying Out the Invention

Referring to Fig. 1, one embodiment of epilation unit embodying the present invention is designated generally by the reference numeral 10. The unit 10 includes a body or cabinet 12 to which are connected a photoepilation probe 14 and an electroepilation probe 16. The probe 14 is coupled to the cabinet 12 by an optical cable or fiber 18. The probe 16 is coupled to the cabinet 12 by an electrical cable 20 such as an RF cable.

The probes 14 and 16 are operated independently of one another, preferably by a respective pair of foot pedal assemblies 22 and 24. The pedal assembly 22, preferably includes a foot switch 26, which controls the operation of the photoepilation probe 14. The photoepilation probe 14 can provide light pulses for a plurality of time periods which can be preset by foot or manual switches, not illustrated. The operation of the probe 14 can be accomplished in accordance with U.S. Patent No. 4,608,978, Method and Apparatus For Photoepilation, issued to Carol Block Rohr on September 2, 1986 and incorporated herein by reference. The probe 14 also preferably can be constructed in accordance with U.S. Patent No. 3,834,391, Method and Apparatus for Photoepilation, issued to Carol Block on September 10, 1974 and incorporated herein by reference.

The unit 10 includes a power switch 28 for turning the unit off and on. The unit 10 can include a manual timer 30 if desired.

The pedal assembly 24, preferably includes a foot switch 32, which controls the operation of the shortwave or radio frequency (RF) electroepilation probe 16. The foot switch 32 can be a variable type of switch or can be separately controlled by an intensity control dial 34 and a duration control dial 36. The intensity of the RF output of the probe 16 easily can be visually indicated by an array or bar graph of indicating lamps 38, such as LED's. Each indicating lamp illuminated corresponds to a particular voltage output

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of the probe 16.

The cabinet 12 also preferably includes a test jack 40 into which the probe 16 can be inserted to calibrate or check the output of the probe 16. The 5 unit 10 also preferably includes a hold switch 42, which is utilized to stop any of the fixed timing cycles of the unit 10 to provide an interrupt to a cycle by the operator of the unit. A cycle counter 44, preferably is provided with the unit 10 and the unit 10 10 can be set to provide a fixed increment cycle, such as 15 minutes, which cycles then are counted by the counter 44.

One schematic embodiment of the unit 10 is illustrated in Fig. 2, with the same numerals utilized 15 for the same elements. A power supply 46 is coupled via a line 48 to a pulsed light source 50. A second line 52 couples the power supply 46 to a shortwave or RF source 54.

The light source 50 provides light pulses to the 20 probe 14, such as from a xenon flash lamp as described in U.S. Patent No. 4,608,978. The shortwave source 54 can be a conventional shortwave or RF source which provides voltage pulses to the probe 16. The intensity of the pulses is set by the control 34 and the duration is 25 set by the control 36. As previously described, the intensity of the probe 16 output is visually displayed by the lamp array 38 and the test jack 40 can be utilized to calibrate and/or test the output of the probe 16.

30 The number of fifteen minute cycles of operation of unit 10 are counted by the cycle counter 44 which is coupled via respective lines 56 and 58 to the unit 10. The hold switch 42 is coupled via respective lines 60 and 62 to both the light source 50 and the shortwave 35 source 54. The hold switch 42 allows the operator to interrupt a fixed time cycle for whatever reason and then to reactivate the cycle when desired. For example, the unit 10 can be set for a fifteen minute cycle and the operator may wish to interrupt the cycle at

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some point. When the hold switch 42 is activated, the unit 10 is placed on hold and no further pulses can be generated by either of the probes 14 or 16.

The epilation unit 10 thus can provide the operator with either photoepilation or electroepilation pulses from the respective probes 14 and 16. The probes 14 and 16 are utilized independently of one another and can be applied alternatively if desired. The pedal assemblies 22 and 24 have been illustrated as being separate units, but can be combined with separate control lines or in a sequentially coupled manner over the same lines.

While a preferred embodiment of the invention has been shown, it will be understood that the invention may be otherwise embodied within the scope of the appended claims. Minor variations in the structure and in the arrangement and size of the various parts may occur to those skilled in the art without departing from the spirit and scope of the invention.

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Claims

1. A method of epilation of hair bodies from a patient, characterized by:

5 providing a unit having a photoepilation probe and an electroepilation probe;

operating said probes independently of one another to remove the hair bodies;

10 providing pulses of light energy from said photoepilation probe at least to a first set of said hair bodies;

providing pulses of electrical energy from said electroepilation probe at least to a second set of said hair bodies; and

15 providing both pulses of light energy from said photoepilation probe and pulses of electrical energy from said electroepilation probe to at least a third set of said hair bodies.

20 2. The method according to claim 1 further characterized by generating said light energy and electrical energy pulses in fixed increment cycles and counting said cycles, controlling the intensity and duration of said pulses of electrical energy and providing a visual display of the intensity of said pulses of electrical energy.

25 3. The method according to claim 1 further characterized by providing alternate pulses of light energy and electrical energy to at least some of the hair bodies of said third set of hair bodies.

30 4. The method according to claim 1 further characterized by providing a predetermined fixed cycle period for applying said light energy and said electrical energy pulses to said hair bodies.

35 5. The method according to claim 4 further characterized by providing means for interrupting and reactivating said fixed cycle period.

6. An apparatus for epilation of hair bodies from a patient, characterized by:

a single unit having photoepilation probe means

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and electroepilation probe means and means for operating said probes independently of one another to remove the hair bodies;

5 providing pulses of light energy from said photoepilation probe at least to a first set of said hair bodies;

providing pulses of electrical energy from said electroepilation probe at least to a second set of said hair bodies; and

10 providing both pulses of light energy from said photoepilation probe and pulses of electrical energy from said electroepilation probe to at least a third set of said hair bodies.

7. The apparatus according to claim 6 further characterized by means for generating said light energy and electrical energy pulses in fixed increment cycles and means for counting said cycles, means for controlling the intensity and duration of said pulses of electrical energy and means for providing a visual display of the intensity of said pulses of electrical energy.

8. The apparatus according to claim 6 further characterized by means for providing alternate pulses of light energy and electrical energy to at least some of the hair bodies of said third set of hair bodies.

25 9. The apparatus according to claim 6 further characterized by means for providing a predetermined fixed cycle period for applying said light energy and said electrical energy pulses to said hair bodies.

10. The apparatus according to claim 9 further characterized by means for interrupting and reactivating said fixed cycle period.

## AMENDED CLAIMS

[received by the International Bureau on 14 November 1988 (14.11.88)  
original claims 1 and 5 amended; claims 2-4 unchanged; new claim 6 added;  
original claim 6 replaced by new claim 7; claims 7-10 renumbered as claims 8-11;  
new claim 12 added (2 pages)]

1. A method of epilation of hair bodies from a patient, characterized by:

providing a unit having a photoepilation probe and an electroepilation probe;

operating said probes independently of one another to remove the hair bodies by independently providing pulses of light energy from said photoepilation probe at least to a first set of said hair bodies and providing pulses of electrical energy from said electroepilation probe at least to a second set of said hair bodies; and

operating said probes by separately providing both pulses of light energy from said photoepilation probe and pulses of electrical energy from said electroepilation probe to at least a third set of said hair bodies.

2. The method according to claim 1 further characterized by generating said light energy and electrical energy pulses in fixed increment cycles and counting said cycles, controlling the intensity and duration of said pulses of electrical energy and providing a visual display of the intensity of said pulses of electrical energy.

3. The method according to claim 1 further characterized by providing alternate pulses of light energy and electrical energy to at least some of the hair bodies of said third set of hair bodies.

4. The method according to claim 1 further characterized by providing a predetermined fixed cycle period for applying said light energy and said electrical energy pulses to said hair bodies.

5. The method according to claim 4 further characterized by interrupting and reactivating said fixed cycle period.

6. The method of claim 2 including providing a visual bar graph of said intensity.

7. An apparatus for epilation of hair bodies from a patient, comprising:

a single unit having photoepilation probe means for providing pulses of light energy from said photoepilation probe means at least to a first set of said hair bodies and electroepilation probe means for providing pulses of electrical energy from said electroepilation probe means at least to a second set of said hair bodies; and

means for operating said probe means independently of one another to remove the hair bodies in said first and second sets of said hair bodies and jointly from both said probe means to at least a third set of said hair bodies.

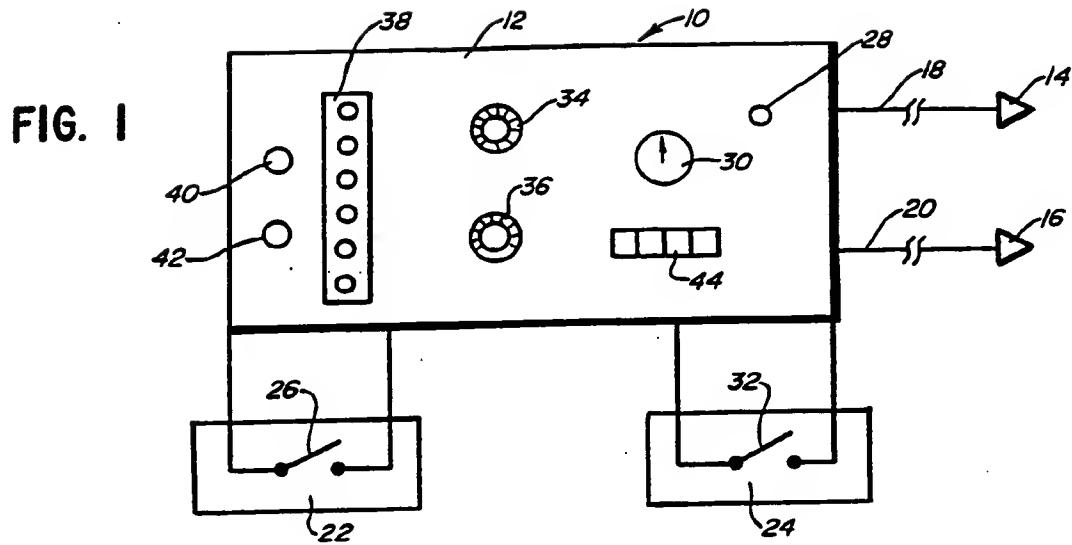
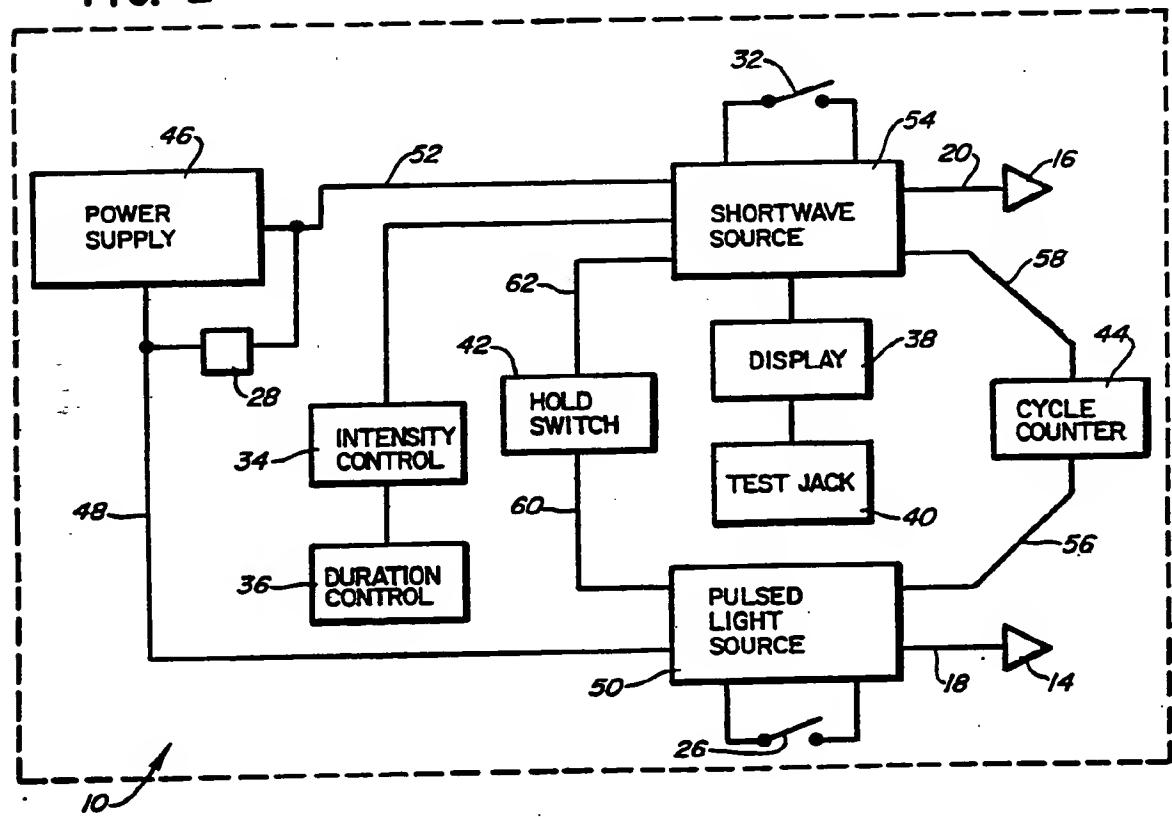
8. The apparatus according to claim 7 further characterized by means for generating said light energy and electrical energy pulses in fixed increment cycles and means for counting said cycles, means for controlling the intensity and duration of said pulses of electrical energy and means for providing a visual display of the intensity of said pulses of electrical energy.

9. The apparatus according to claim 7 further characterized by means for providing alternate pulses of light energy and electrical energy to at least some of the hair bodies of said third set of hair bodies.

10. The apparatus according to claim 7 further characterized by means for providing a predetermined fixed cycle period for applying said light energy and said electrical energy pulses to said hair bodies.

11. The apparatus according to claim 10 further characterized by means for interrupting and reactivating said fixed cycle period.

12. The apparatus of claim 8 wherein said visual display means include a visual bar graph of illuminating devices to provide said display.

**FIG. 2**

# INTERNATIONAL SEARCH REPORT

International Application No. PCT/US88/02235

## I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) <sup>8</sup>

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC (4): A61B 17/36  
U.S. C1. 128/303.1

## II. FIELDS SEARCHED

Minimum Documentation Searched <sup>7</sup>

Classification System	Classification Symbols
U.S.	128/303.1, 303.18, 735

Documentation Searched other than Minimum Documentation  
to the Extent that such Documents are Included in the Fields Searched <sup>8</sup>

## III. DOCUMENTS CONSIDERED TO BE RELEVANT <sup>9</sup>

Category <sup>10</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
Y	US, A, 4,112,923 (TOMECEK) 12 September 1978 See the entire document.	1-10
A	US, A, 4,372,315 (SHAPIRO) 08 February 1983 See the entire document.	1-10
Y	US, A, 4,550,728 (RUNYON) 05 November 1985 See the entire document.	1-10
Y	US, A, 4,598,709 (SMITH) 08 July 1986 See the entire document.	1-10
Y	EP, A, 0,142,671 (ROHR) 29 May 1985 See the entire document.	1-10

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## IV. CERTIFICATION

Date of the Actual Completion of the International Search

08 August 1988

International Searching Authority

ISA/US

Date of Mailing of this International Search Report

27 SEP 1988

Signature of Authorized Officer

  
Lee S. Cohen